

Operation Water Drop - Testing the Water We Drink!

Elementary

Subject: Science, Biology, Chemistry, Health

Topic: Testing the water we drink!

Time Frame: Approximately 40 minutes

Objectives: There are 7 tests to be run in this kit, teachers will demonstrate 3 different tests, and these tests are: Heterotrophic Plate Count, Alkalinity, and Sulphate. The students can do the other 4 tests with a minimal amount of help, these tests are: pH, Colour, Free Chlorine, and Total Hardness. Provided with Operation Water Drop kit are supplies to run tests on the local drinking water source, and on a Canadian Drinking Water Guideline sample. The guideline sample is for quality control purposes (was the test performed properly?). This will also be a reference to see what a sample would look like if it meets the Canadian Drinking Water Guideline, Students are then expected to gather their own water samples for the Local Treated Water, Local Untreated Water, and Deionized Water tests. They will then be able to compare their own community drinking water to the Canadian Drinking Water Guideline. If it is impossible that the students collect their own community's water, SDWF will provide water samples for testing, at a charge of \$10 per Operation Water Drop Kit, to cover shipping costs. **It is recommended that teachers assign a Class Captain student who will track student and teacher opinions of OWD and complete the required Evaluation form and submit it to SDWF along with the community analysis sheet and any pertinent suggestions. In return, the SDWF will use this information and the information received in the online Water Quality Data Form to put your school on the map!**

Methodology: The tests will include: precipitation, colourimetric, visual, bacteriological, and test strips. All procedures, instructions, and reference material are available online for easy reference and reporting. It is suggested you print out the individual test instructions for quick reference and follow instructions closely. It is also recommended that you print the materials list (In Landscape), to insure you have all materials.

Materials: Each Operation Water Drop Test Kit contains 7 test supply bags with all requirements for testing your drinking water, and the Canadian Drinking Water

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Guideline Limit sample; for each analyte tested all supplies required are packaged in one bag for your convenience. You will find a list of all materials sent in the OWD kit; please cross-reference your list with material received to ensure you have all of the material required.

Please check to make sure that you have received all of the material listed below.
All of the test materials will be packaged in separate bags for each determination (Test).

Materials List For Elementary School Operation Water Drop Kit

<u>Test</u>	Vial size (mL)	# In Kit	<u>Test</u>	Vial Size (mL)	# In Kit
Alkalinity			pH		
Alkalinity (low limit sample)(Tube)	50	1	pH 7 Buffer	5	1
Methyl Purple Indicator	1.5	1	pH Indicator Strip (Tube)	10	4
0.02N H ₂ SO ₄	15	2	pH Scale card		1
Disposable Pipette	1.2	1	Disposable Beaker	10	3
Drink glass		2			
Colour			Sulphate		
Colour Standard (Tube)	50	1	Sulphate Standard (Tube)	2	1
Glass test tubes	25x150 mm	3	Sulphate Reagent # 1 (Tube)	5	3
			Sulphate Reagent # 2 (Tube)	5	3
			Disposable Pipette	2	3
			Drink glass		3
Heterotrophic Plate Count			Total Hardness		
Sterile Pipettes	1.7	2	Total Hardness(SGLS)	10	1
Sterile Spreader		2	Test Strip Packets		2
Petri Dish	100x15	2	Disposable Beaker	10	2
Heterotrophic sampling tube	5	1			
Free Chlorine					
Test Strip Packets		2			
Drink glass		2			
Total # of beakers and glasses					
Drink glasses		7			
10 mL Disposable Beakers		5			

Additional materials:

Although the OWD kit is complete, there are a few things that will be needed to ensure analyses are performed with ease and accuracy.

Each group should have:

- A permanent marker for test tube labeling
- Masking tape for labeling pipettes
- A 25 mL and a 50 mL measuring device (preferably a graduated cylinder)
- A test tube rack

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Space Requirements: Students should be in a room with sufficient bench or desk space to work comfortably in small groups to conduct their tests.

Directions:

The Teacher and students will be testing water for the following parameters:

Approximate Time for all tests to be completed (40 minutes)

- | | | |
|------------------------------|---------------|------------------|
| 1. Heterotrophic Plate Count | 2. Alkalinity | 3. Sulfate |
| 4. Colour | 5. pH | 6. Free Chlorine |
| 7. Total Hardness | | |

Teacher Demonstration: Heterotrophic Plate Count, Alkalinity, and Sulphate.

Student Tests: 4 groups with each group doing a different test (Colour, pH, Free Chlorine, and Total Hardness) on the water sample and the Canadian Guideline Limit Sample.

The teacher should do the demonstration on the three tests (20 minutes), then split the class up, classroom should be divided into 4 separate groups; each group will be running tests on their own drinking water plus a Canadian Guideline Limit Sample that is supplied for all analytes. The following distribution of the tests among the students will consume approximately 20 minutes:

It can not be overstated how important it is to be clean and careful while doing all of these tests.

Results:

After the tests have all been completed, the teacher should lead a discussion on the results that were found and e-mail your results to "Put your school on the Map" at <http://www.safewater.org> The class and teacher should also prepare an evaluation with your comments + suggestions. The success of the Operation Water Drop program depends on this feedback, and reporting. The Safe Drinking Water Foundation thanks everybody in advance for their cooperation in the reporting of their results.

Possible Presentation Questions/Topics:

- ▶ Does it concern you that Canada has no national regulations (just guidelines) for drinking water?
- ▶ Do you feel Rural (including aboriginal and non-aboriginal) people should be concerned about their drinking water?
- ▶ Is your water treatment plant modernized?
- ▶ Are your water treatment plant operators certified?

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- Are you comfortable/satisfied that your community water is safe?
- For more questions and possible solutions please refer to the fact sheets that are attached to the methods.

Evaluation: Presentation Checklist

Requirements	Yes	No
Did the group prepare a summary sheet of information for the rest of the class?		
Did the group demonstrate their knowledge about their topic?		
Was the presentation approximately 3-5 minutes in length?		
Did the group come up with a creative way to present the information?		
Did the group complete a poster to demonstrate what they have learned?		

Resources:

Visit the Safe Drinking Water Foundation Website www.safewater.org to learn more about issues affecting safe drinking water. Once at www.safewater.org go to public education and then fact sheets to find more information about several of the tests that you have or will run.

You will find links to many Educational Fact Sheets and various articles published pertaining to the different analysis which students conduct as part of Operation Water Drop.

For more information on health risks and possible contributors of all chemicals you can go to the following website: <http://www.lenntech.com/WHO-EU-water-standards.htm> you will also find the drinking water standards for the World Health Organization, and the European Union at this site.

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